

Introduction to the Nigeria IEP Project

Background / Context for Project

An Integrated Energy Plan (IEP) for Nigeria consists of an enhanced least-cost electrification plan and a clean cooking plan, which are accessible through an online, interactive geospatial visualization tool. With updated and new data, the IEP for Nigeria determines the optimal approach to achieving universal electrification in Nigeria and its associated costs. Moreover, by incorporating clean cooking, the model facilitates an integrated view between electrification and clean cooking solutions. By including cooking, the model should serve as central and common framework around which different stakeholders can explore linkages, evaluate trade-offs, compare consequences and coordinate different clean cooking strategies. It is also meant to facilitate enhanced technology/fuel-specific decision-making, especially for LPG and electric cooking (e.g., identifying attractive markets or distribution strategies).

Benefits to different stakeholders

The insights of the Integrated Energy Plan (IEP) for Nigeria can benefit several stakeholders. For the Nigerian government, the IEP informs the investment requirements for achieving universal electrification, including the affordability gap, along with evaluating the ideal technology mix (e.g., solar home systems, mini-grids or grid extension) for achieving universal electrification based on factors like ability-to-pay, energy consumption demand, proximity to grid, etc. The project also provides a new series of analyses and findings on clean cooking, particularly around the opportunity, feasibility and implications for expanding LPG and electric cooking.

For the private sector, the benefits will be focused on a significant reduction in some of their development costs. With high-quality data and information, the private sector can make decisions in a data rich environment, which can lead to higher probability of success.

What does the tool do?

The Integrated Energy Plan (IEP) for Nigeria offers users an interactive tool to visualize all relevant and available data layers used as inputs to the analysis. Users can select their own parameters and download results of the model from the tool. The data can be visualized on the tool with a high spatial resolution at the settlement level. What does the model do?

The Integrated Energy Plan (IEP) details the location and clustering of demand load centers at a settlement level and determines the most cost-effective technological approach to electrify each load center. The analysis considers least-cost supply and demand considerations, affordability, technical and economic viability, all within the national context. A sensitivity analysis is undertaken to examine the robustness of the model's key outputs to changes in key input assumptions. Users can display results of key sensitivity variables, such as technology and supply costs and population growth rate, on the tool.

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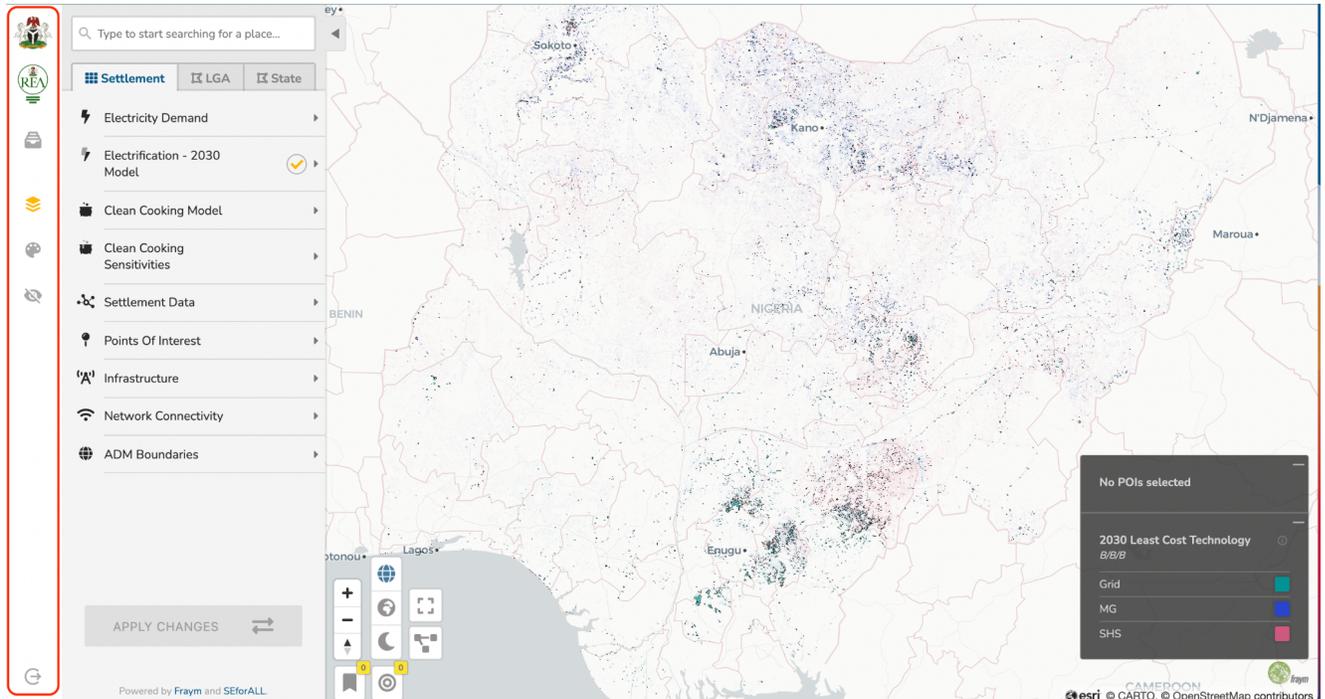
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Viewing Different Countries

If your subscription includes multiple countries, you can access them by using the switch to another dashboard button. Select the folders icon [] on the far-left side of the interface, just below the Fraym logo. From the dropdown menu that populates, select your country of interest or type in the name.

Main Sidebar

The Main Sidebar are the vertical icons on the far left of the interface. From top to bottom these buttons are the Fraym logo, which resets the interface to your company's default dashboard, switch to another dashboard, categories, map styling, upload your data, metadata, FAQs, hide map overlay buttons, and log out.

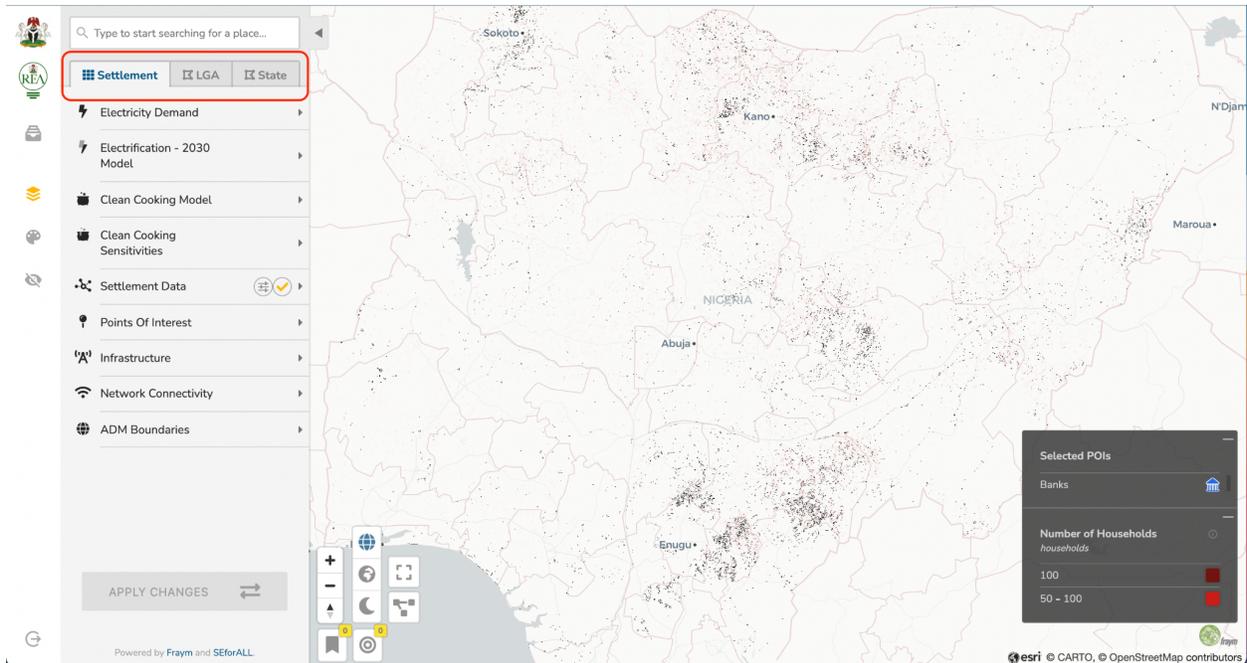


Changing Color Ramps and Data Scales

To change the color ramp and data scale of the main display map, click on the paint palette [] on the far left-hand side of the platform to open the map styling options. Once you click on the map styling tool, you will see the options for both color schemes for the primary-selected indicator (base map), and for the bucketing classification for the base map. Bucketing options include Equal interval, Jenks artificial, breaks, Jenks big cities, and Quintiles. Explanations for each bucketing classification can be found by hovering your mouse to help you decide the best option for your use.

Changing Units of Analysis

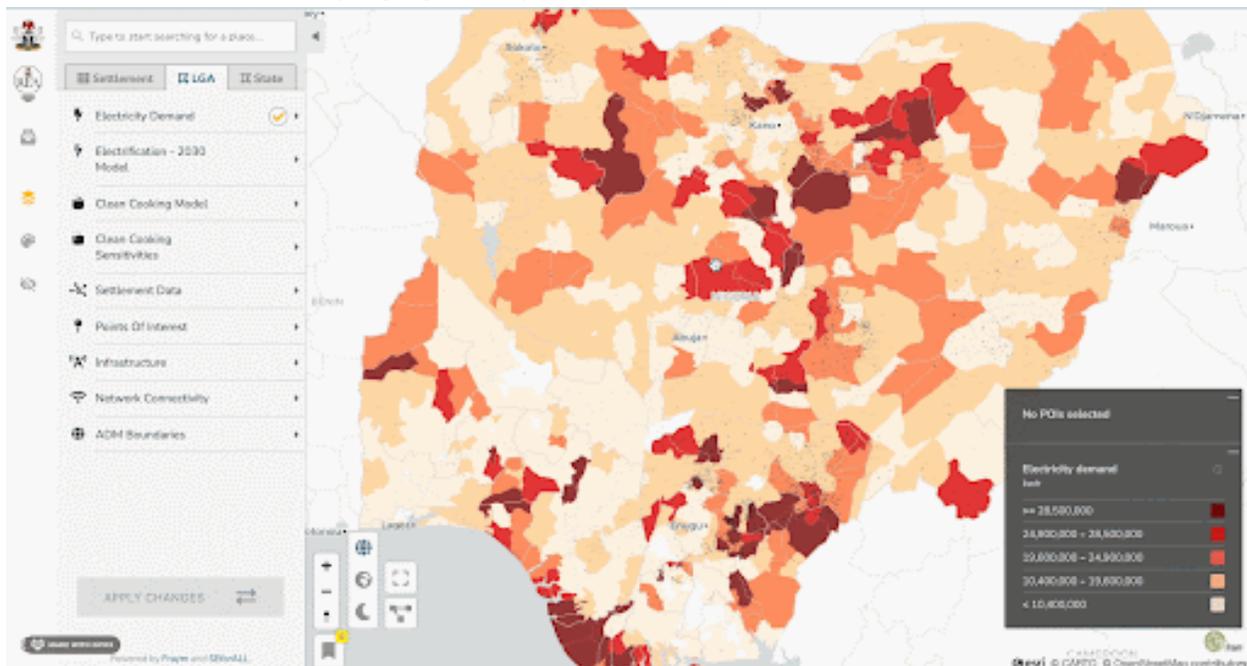
DATAfraym offers three different scopes at which you can view your data. These viewing options can be accessed by the tabs just below the search bar on the upper left side of the interface.



There are three main scopes which each county can be viewed at. These are the grid or settlement view, the local government area (LGA) view, and the state or regional view.

Saved Locations Tool

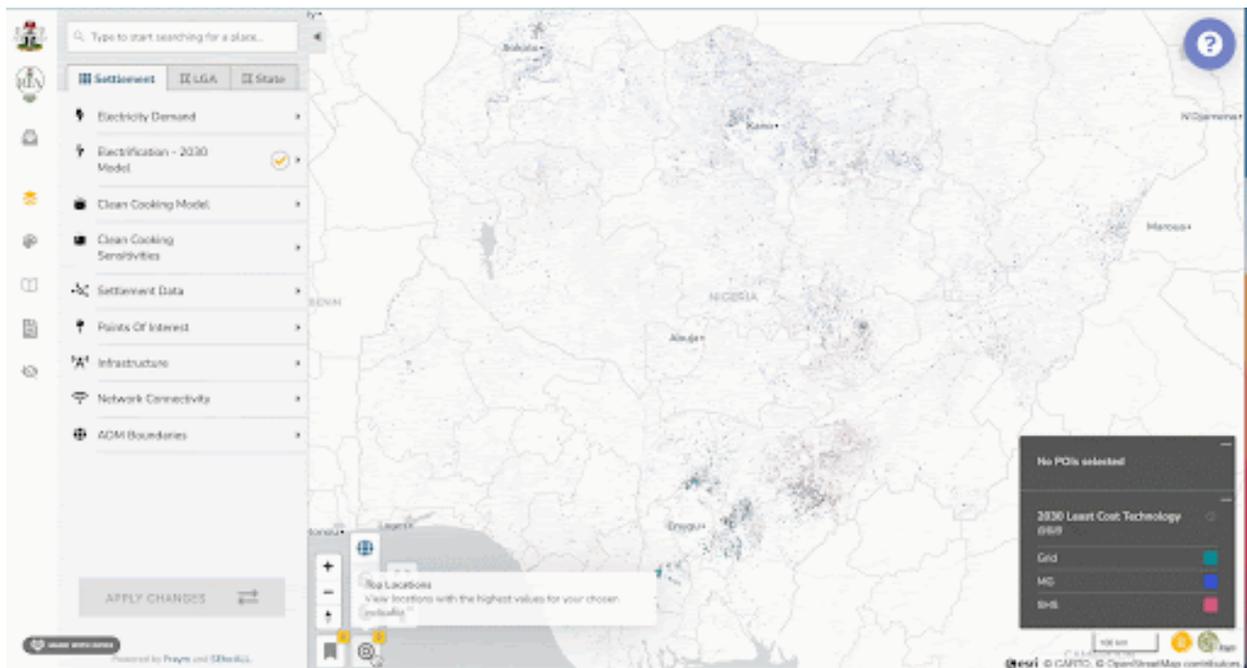
Saving locations can be useful if you want to export or analyze the individual data for a specific administrative area or state. Locations can be saved by selecting them and pressing the save button in the infobox and can be viewed later by pressing on the saved locations modal in the map overlay buttons. Your saved locations will stay highlighted in yellow on the map.



In the saved locations modal, you will be able to see the regions you have saved and the base indicator that you are viewing. If you change the indicator on the map the new indicator will be shown in saved locations. The saved locations modal will show values for all indicators that appear in the infobox. The saved locations table is sortable so you can sort your locations by ascending or descending order for any of the indicators. This table can also be exported and used for further analysis of your specific chosen areas. Clicking on the black arrow next to the location name will move the map to that location.

Top Locations Tool

The Top Locations Modal is used to identify the regions with the highest populations for a specific indicator. Click on the 'Bull's Eye' icon  from the map overlay buttons when the scope 'Grid' is selected. After clicking on the Bull's Eye, a popup will appear, click 'apply' and a list of the top 50 areas for your indicator will populate. To view these areas on the map, click on the black arrows to the left of each location name.

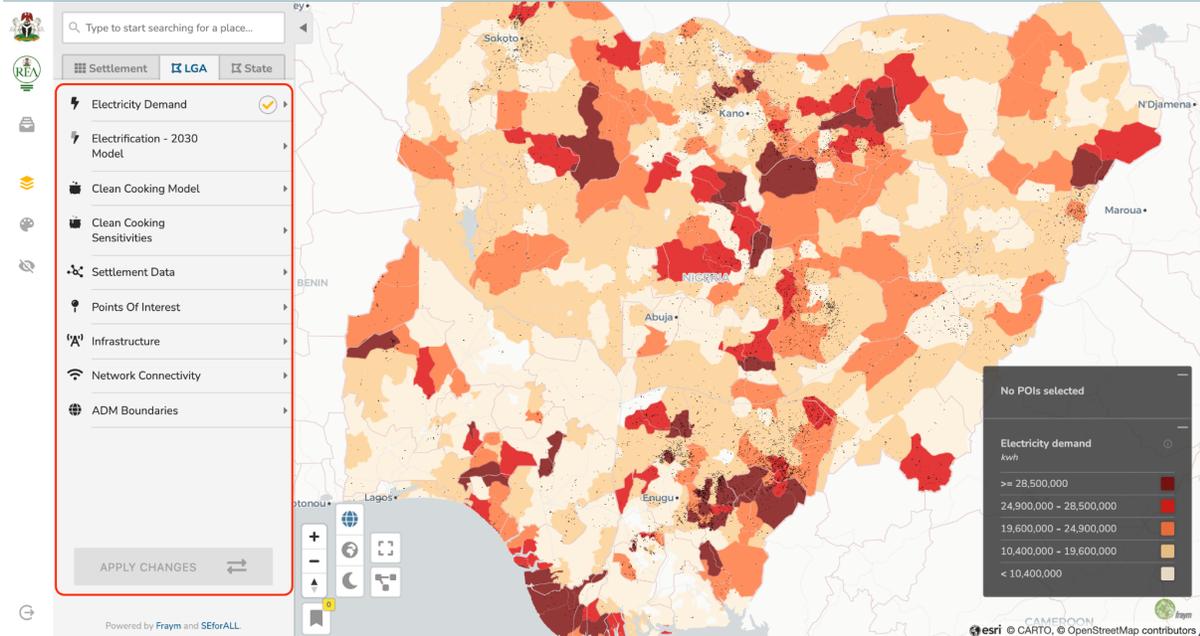


Selected locations will be marked with a blue target on the map. Within the options in the pop up there will be a button called 'Bottom' as well, clicking this and then clicking apply will populate the list with the bottom 50 areas for your indicator. You will also be able to restrict the geographies that appear on the list and export the data table that is generated with the top locations.

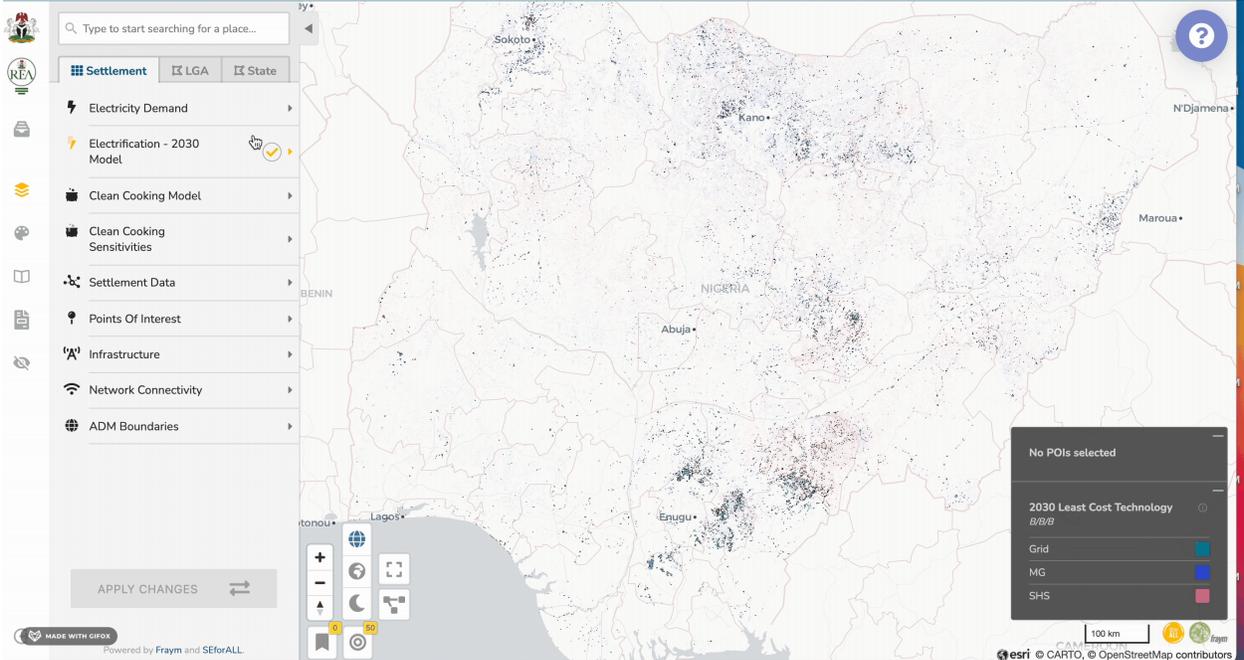
Glossary of Terms

Indicator Drawer

The Indicator Drawer, which can be found on the left side of the interface below the different scopes, houses the different data sets that can be displayed on the map or viewed in the infobox.



Each indicator is stored in an indicator category. Each indicator category has an icon, a title and an open button. Clicking anywhere on the indicator category will open a new section with the list of indicators belonging in this category. Clicking on the indicator category again will hide the list back.



Each indicator will have a tooltip icon that when hovered over will reveal a pop up with the definition of that indicator, a title, a button to make it the base layer of the map, a toggle button to show/hide the

indicator in the infobox, a toggle button to show/hide filters for that indicator and, where applicable, a button to show secondary data.

Infobox

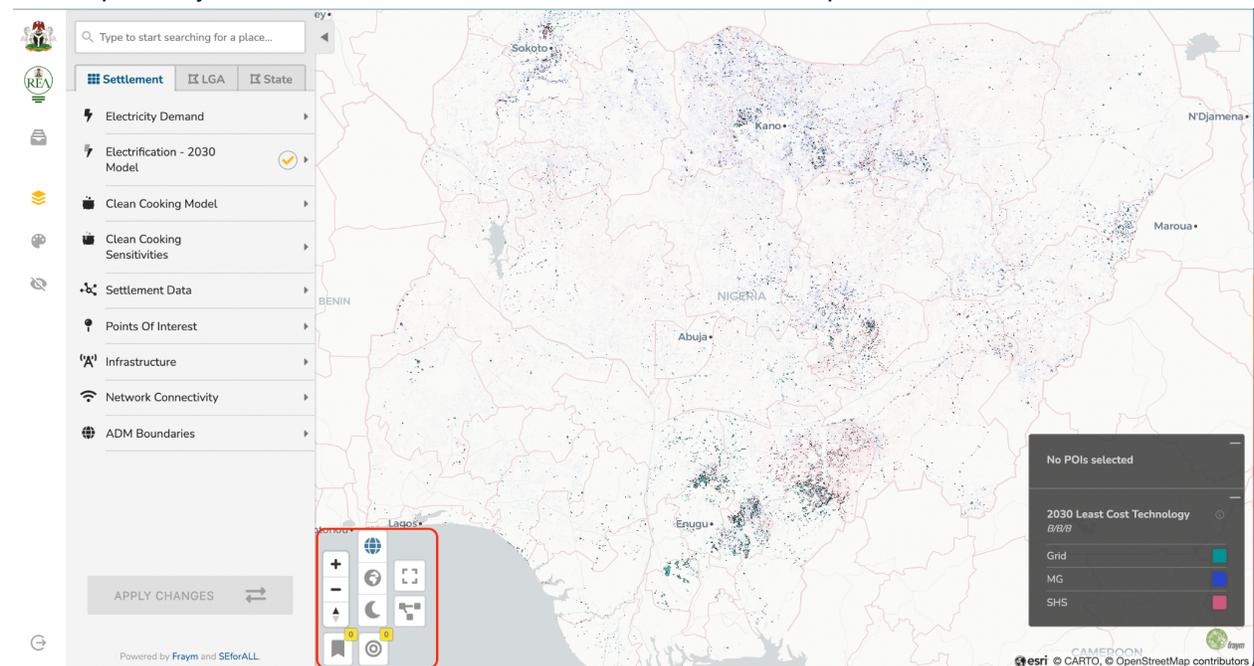
The Infobox is the right-hand side panel that is displayed when a region is selected. Data for all indicators that are turned on will be displayed in the infobox when a region is selected. The infobox is also where a region can be saved, a report can be submitted, and the data can be exported into a csv.

Legend Box

The legend box is at the bottom right corner of the map interface and will display the information for the selected base indicator.

Map Overlay Buttons

The map overlay buttons are found in the bottom left corner of the map interface.



The plus and minus buttons are the zoom in and out buttons. [+]

The middle three buttons are used to switch the imagery style of the map, either map imagery, satellite

imagery, or dark imagery. [  ]

The square icon [] on the right top of the overlay buttons resets the zoom and centers the map.

Multi select mode  allows you to select multiple regions at once either by drawing a polygon or using the lasso tool.

The bullseye icon  identifies the top 50 locations for your variable (that is, the 50 areas with the highest concentrations of people for your selected indicator).

The Analytics tool  allows you to take a more analytical look at the data by generating scatter plots and looking into time series data.

The saved locations tool  where you will be able to view any locations that you have previously selected and saved.

And finally, there is a sales report button  where a Q4 sales report can be downloaded.

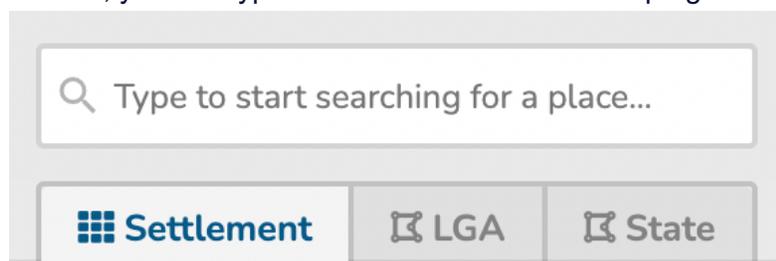
Multi Select Mode

The multi-select mode is used to aggregate population characteristics across multiple 1km² grid cell or administrative divisions. Click on “multi-select mode”  at the bottom of the map overlay buttons. Click on the 1km² grid cells or the administrative divisions for which you want aggregate statistics. These areas will turn blue as you select them and will continuously be added to the info box and aggregate the statistics of these areas. If you don't want to select cells/divisions one at a time, you can use the polygon and lasso selection tools  to select multiple cells/divisions at one time. Press and hold the shift key and click and drag over the regions you intend to select. After the desired areas have been selected, the infobox will open entitled ‘Multi-select Model’ and display aggregate statistics for your selected areas for the selected indicators. To clear selections click on the ‘stop icon’ to the right of the multi-select tool icon for the selected indicators.

FAQs

Question: Can I search for and view a specific location?

DATAfram solution: Yes, to view specific cities, administrative regions, even towns of interest, you can type the location name on the top right corner next to the magnifying glass.



Question: How do I zoom in on a specific area?

DATAfram solution: To zoom in quickly to an area, hold down the “Shift” key and the left mouse button and draw a box around the area of interest. Alternatively, you can use the scroll button on your mouse to zoom in and out on the map.

Question: How do I turn on indicators in the information box?

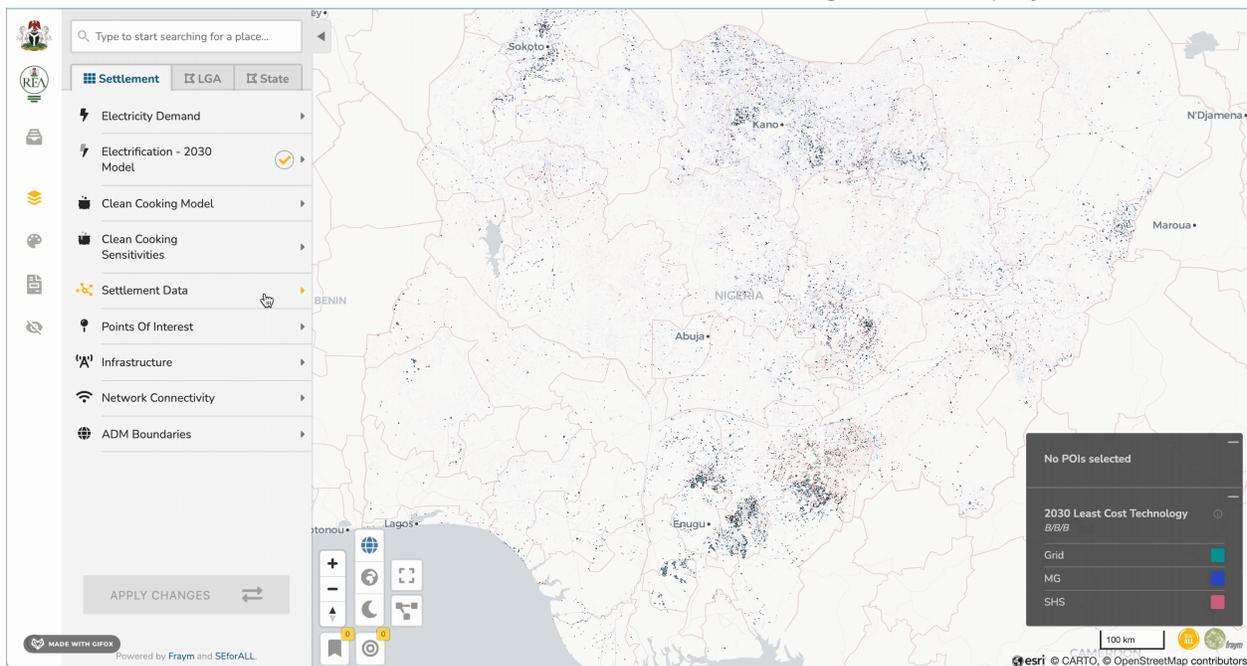
DATAfraym solution: All available indicators are housed on the left-hand side below 'Grid' and 'LGA'

1. To turn on a desired indicator, click on a category of interest, such as "Clean Cooking Model," and turn on the toggle underneath the indicator so it turns yellow
2. You can select as many as you like across categories
3. Click "Apply Changes"
4. Left clicking on any cell, LGA, or collection of grids and LGAs will display information on all the indicators you selected in the information box

Question: Can I filter within indicators?

DATAfraym solution: Yes, it is possible to filter within specific indicators based on percentages or absolutes to help locate concentrations of your target consumers at a more granular level.

For example, you can filter settlements in which there are between 50 and 100 households. Areas in which the number of households fall outside of this range will be displayed in white.



Question: How do I save and export data from DATAfraym?

DATAfraym solution:

1. Select the indicators/data you want to export. Note, whatever shows up in the Information Box is what will be included in the downloaded information.
2. Select the territory that you want to save. This could be a single grid, LGA, Province, State.
3. When the Info Box pops up, click Save.

4. The territory you have saved will show up in the bottom left-hand corner in the Saved Locations button.



5. Click the yellow Export Data button.

Question: How can I create a consumer profile?

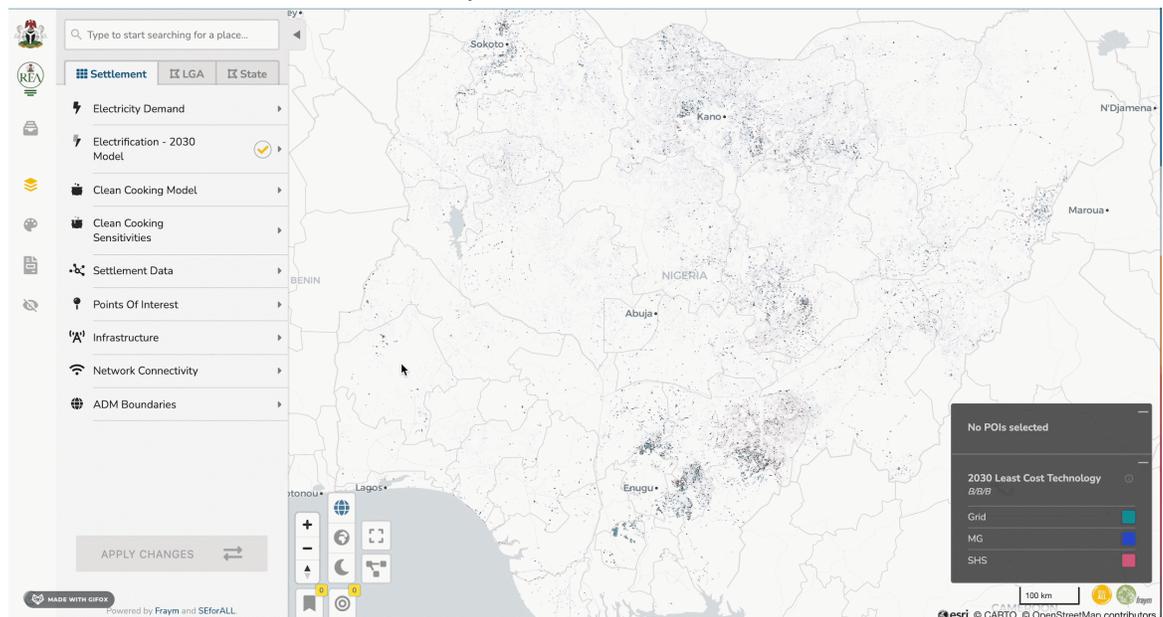
DATAfraym solution:

1. Select the indicators that are critical for your target consumer in the info box
2. Click “Apply changes”
3. View information for that profile when you click on an admin area or a 1km2 grid

Question: How can I take a clean screenshot of the map?

DATAfraym solution:

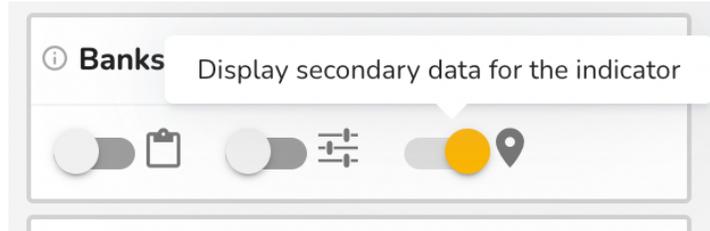
1. Press the arrow next to the search bar to hide the side panel
2. Press the hide map overlays button from the main sidebar
3. You will now be left with a clean map and can take a screenshot



Question: How do I turn on Points of Interest (POIs)?

DATAfram solution:

1. Open the indicator category titled Points of Interest
2. Turn of the farthest toggle to the right to display secondary data for the indicator



3. Click "Apply Changes"

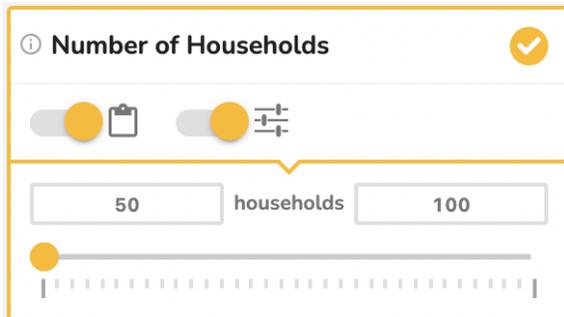
Note that when you are zoomed out, the POI will show as aggregated POI and you will need to zoom in to see the details.

Use Cases

Question: What if I am only interested in settlements where there are between 50 and 100 households?

DATAfram solution:

1. Open the indicator category of interest, "Settlement Data"
2. Open the indicator of interest, "Number of Households"
3. Turn the first and second toggle on the left under the indicator
4. Type in the range you would like to see, in this instance, type in 50 and 100
5. Click "Apply Changes"



Question: Which LGAs in Nigeria have the highest concentrations of the country's Health Facilities?

DATAfram solution:

1. Select Nigeria as the country
2. Select LGA tab for viewing scope
3. Check the Health Facilities indicator under the Points of Interest indicator category.
4. Click Apply changes

Question: How do I find all unelectrified communities with between 50 and 100 households in Nigeria?

DATAfraym solution:

1. Select Nigeria as the country
2. Select Settlement tab for viewing scope
3. Check the Number of households indicator as the base indicator under the Settlement Data indicator category.
4. Check the toggle to enable filters for this indicator and set the range from 50 to 100
5. Go to the Electrification Status indicator in the Settlement Data indicator category and turn on the first and second toggle on the left under the indicator
6. Click "Apply Changes"